

REMARKS

Applicant has carefully reviewed the final rejection, and respectfully requests reconsideration in view of the following remarks. A separate petition and fee to extend the time to respond by two (2) months accompany this response.

Claims 1-12 are pending in this application, among which, Claims 1-10 have been finally rejected, while Claims 11-12 have been withdrawn from further prosecution.

Claim Rejections – 35 USC §102

Regarding the pending claims, the examiner has maintained her rejection of Claims 1-8 under 35 USC §102 (b) as being anticipated by Honel et al. (US 5,055,542). Reconsideration and withdrawal of this rejection are respectfully requested.

Applicant argued previously that Honel et al. teach a reaction that proceeds in the reverse fashion to the present invention and therefore a different structure is produced.

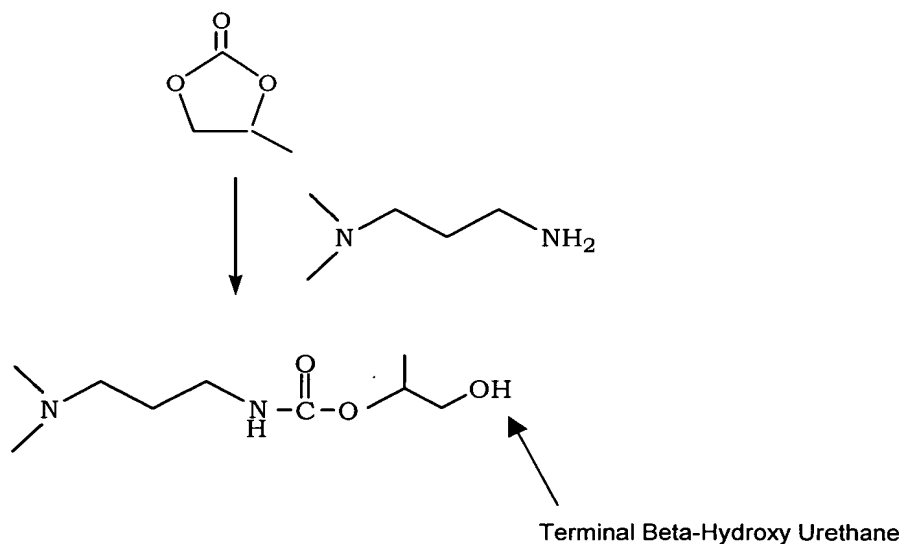
To further clarify this statement, in contrast to the present invention in which the cyclic carbonate ring opening reaction occurs before attachment to epoxy, in Honel et al. the carbonate is attached to an epoxy backbone first and ring opening with an amine is accomplished on this preformed backbone. As a consequence Honel et al. cannot achieve the same structure as in the present invention.

Honel et al. disclose that the dispersant is produced by first reacting a polyamine with a polyfunctional cyclic carbonate polymer, i.e., a cyclic carbonate that has already been attached to a epoxy backbone (col. 6, lines 1 to 67), followed by reaction with acid and this reaction product is then quaternized with additional epoxy compound. Since Honel et al favor the production of large polymers, rather than small molecules, the preformed epoxy backbone is the desired approach.

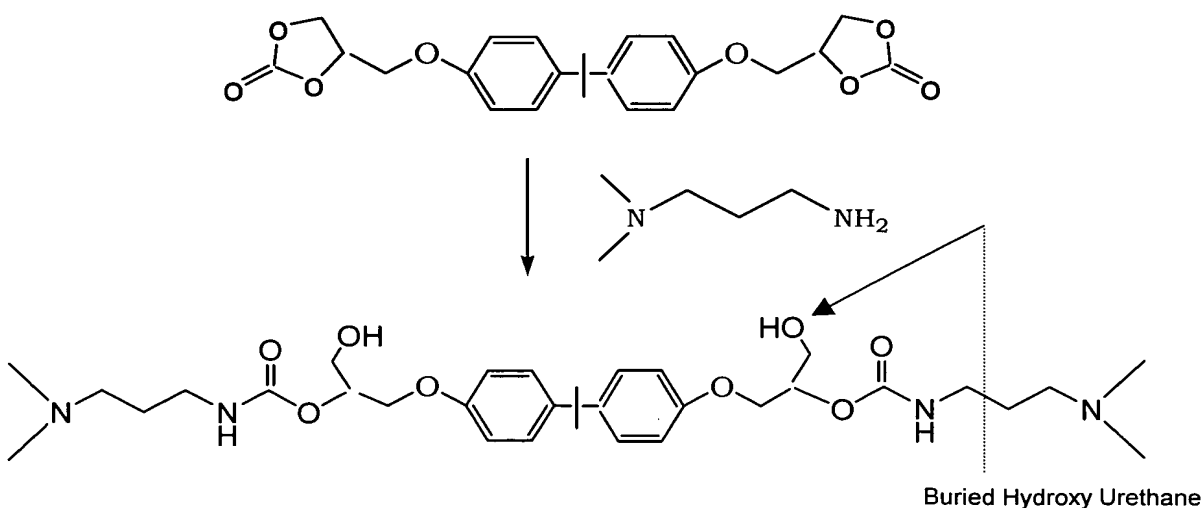
In contrast, in Applicant's invention the dispersant is a small molecule produced by having a polyamine first reacted with a monofunctional cyclic carbonate (i.e., an alkylene carbonate) rather than a polyfunctional cyclic carbonate, followed by reaction with acid and then quaternization with an epoxy resin.

A key difference of Applicant's approach compared to the approach used in Honel et al is that by using monofunctional cyclic carbonates in the ring opening reaction, a ring-opened carbonate with a β -hydroxy terminal group, i.e., a terminal β -hydroxy urethane is produced. This can be seen in the drawings supplied below showing the carbonate ring-opened intermediate formed after the first reaction using both approaches.

Applicant's approach



Honel's approach



Applicant's structure is most desirable; when Applicant's electrocoating composition is baked, the terminal urethane group, which remains in the final dispersant molecule, can deblock and be converted to an isocyanate group which can then react with the principal epoxy-amine adduct backbone resin used in the electrocoating. This allows the dispersant to become a permanent part of the coating film which prevents deterioration or delamination of the film upon aging and corrosion of the underlying part, as may occur if the dispersant remained an unreacted component.

Therefore, while the concepts of Honel and the present invention are similar, i.e., to provide a pigment dispersant resin containing epoxy groups and water-dispersible quaternary ammonium groups, the starting materials are significantly different and therefore significantly different structures are produced.

Regarding Applicant's other argument that Honel et al. is not applicable against the present claims given that all the present claims now recite "consisting essentially of" transitional language, the examiner is correct in saying that the monoisocyanate compounds (Honel's component (c)) are optional and it is not required that the dispersant of Honel et al contain such arms. However, it is clear that Honel et al favor large molecules and therefore this approach of introducing long chain urethane arms on the epoxy backbone is desired.

On the other hand, the use of any materials that would increase molecular weight and build viscosity in the pigment dispersant and as a result raise the VOC of the electrocuting bath is undesired in the present invention. The "consisting essentially of" language used in the present claims therefore can be considered in a broader sense to preclude all compounds which would have this same undesired effect, i.e. building large bulky molecules, and therefore should be considered to preclude the use of large preformed cyclic carbonate polymers like Honel's component (b).

For the forgoing reasons along with the reasons already presented in Applicant's previous response, the present invention constitutes a significant advancement in the art, not just a simplification over Honel's approach, and should be deemed patentable.

Reconsideration and withdrawal of the 102 (b) rejections over Honel et al. are therefore respectfully requested.

The examiner has also maintained her rejection of Claims 1-10 under 35 USC §102 (b) as being anticipated by Klein et al. (US 6,268,409).

Reconsideration and withdrawal of this rejection are respectfully requested.

Regardless of whether Klein et al's material is used as a binder or pigment dispersant, the structure produced in Klein et al. is entirely different than that of the present invention.

The first reaction in Klein et al is that of an amine with an epoxy. After the initial reaction of the primary amine with the epoxy, the product can further react with additional epoxy to form the desired epoxy-amine adduct for use as a binder resin. This is noted in Klein et al. column 2, lines 42-48. The sequence of reactions in Klein et al leads to chain extension and polymerization. As the examiner points out, the epoxy used in the initial reaction may also contain cyclic carbonate groups (col. 2, lines 6 to 11). However this is the same as in Honel et al. where the starting cyclic carbonate that is used is a pre-formed polyfunctional cyclic carbonate polymer, i.e., a cyclic carbonate that has already been attached to a epoxy backbone. Therefore, while Klein et al, like Honel et al., also teach use of cyclic carbonate groups, these groups are attached to the epoxy resin backbone first and ring opening with an amine would be accomplished on this preformed backbone. As a consequence Klein et al cannot achieve the same structure as in the present invention. No terminal beta-hydroxy urethane groups can be formed.

For the forgoing reasons along with the reasons already presented on the record in Applicant's previous response, the present invention is significantly different from the teachings of Klein et al. and should be deemed patentable thereover.

Reconsideration and withdrawal of the 102 (b) rejections over Klein et al. are therefore respectfully requested.

The Applicant has previously amended the claims to more clearly point out the invention and the patentable differences between Applicant's invention and the cited art have been further set forth herein. The application should now be in allowable form. If for some reason the application is not allowable, Applicants' attorney request a telephonic interview with the Examiner to discuss the case and any additional amendments to the claims that may be required to place the case in allowable form.

Respectfully submitted,



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